IN THE CLAIMS

1. (currently amended) A method for determining the identity of one or more mutations or single nucleotide polymorphisms (SNPs) in a genome, comprising:

a. contacting a sample genome, under conditions which permit template dependent ~~dependant~~ oligonucleotide ligation, with a plurality of different oligonucleotide molecules which comprise

(i) a first set of at least two oligonucleotides, each comprising a sequence of nucleotides that is complementary to a region on said genome that includes a known SNP site, wherein a nucleotide complementary to the known SNP site is ~~and which oligonucleotides are complementary to said region other than at a base~~ at or near the 5' end of each of said oligonucleotides and ~~that is to be tested for complementarity to a base at the SNP site~~, each of said oligonucleotides further comprises ~~comprising~~ a unique label which is a unique coding sequence of nucleotides, wherein said unique coding sequence of nucleotides is specific for the nucleotide complementary to the known SNP site ~~to identify both the base to be tested~~ and the position of the SNP to be scored,

(ii) a second set of at least two oligonucleotides, each oligonucleotide comprising a sequence of nucleotides complementary to a region on said target genome for hybridisation with said target genome adjacent to the 5' end of an oligonucleotide of said first set of at least two oligonucleotides ~~oligonucleotide set~~, and a surface capture moiety,

a phosphate moiety being located at any of either the 5' end of said first set of at least two oligonucleotides or the 3' end of said second set of at least two oligonucleotides, wherein said contacting effects hybridization of the first and second set of at least two oligonucleotides to the sample genome and generates ligated oligonucleotides,

b. immobilising the ~~any resulting~~ ligated oligonucleotides ~~oligonucleotide being immobilised~~ on a solid support via the surface capture moiety to generate immobilised ligated oligonucleotides,

c. ~~b.~~ performing a sequencing reaction on the immobilised ligated oligonucleotides to

determine at least the unique coding sequence of nucleotides ~~analysing said solid support for the identity~~ of one or more of said unique labels, wherein determining the unique coding sequence of nucleotides of a unique label identifies the nucleotide complementary to the known SNP site and the position of the SNP to be scored, and comparing identified nucleotides complementary to known SNP sites ~~the defined bases~~ in any of said immobilised oligonucleotides to those of ~~the reference~~ one or more reference SNPs.

2. (currently amended) The ~~A~~ method according to claim 1, wherein in step (a) each of said oligonucleotides in said first oligonucleotide set includes one of any of the defined nucleotide bases A, C, T or G for testing for complementarity with said SNP.

3. (canceled).

4. (currently amended) The ~~A~~ method according to claim 1, wherein each of the oligonucleotides of said first oligonucleotide set includes a hairpin oligonucleotide.

5-6. (canceled).

7. (currently amended) The ~~A~~ method according to claim 1 wherein said oligonucleotides are immobilised on said support at a density that allows each immobilised oligonucleotide to be individually resolved by optical microscopy.

8. (currently amended) The ~~A~~ method according to claim 1 wherein the ligated product of said first and second sets of oligonucleotides comprises between 10 and 70 bases.

9. (currently amended) The ~~A~~ method according to claim 1 wherein the ligated product of said first and second sets of oligonucleotide comprises from 30 to 50 bases.

10. (currently amended) The ~~A~~ method according to claim 1, wherein said method is performed for a plurality of SNPs.

11. (currently amended) The ~~A~~ method according to claim 1 wherein said sample genomic DNA is fragmented prior to contacting with said sets of oligonucleotides.

12. (currently amended) The ~~A~~ method according to claim 1, wherein said oligonucleotides are contacted with said genome in the presence of a DNA ligase.

13. (currently amended) The ~~A~~ method according to claim 1, wherein said first and second sets of oligonucleotides are contacted with said genome under conditions that permit non-enzymatic chemical ligation.

14. (currently amended) The ~~A~~ method according to claim 13, wherein said oligonucleotides comprise ~~are contacted with~~ 5'-iodide and 3'-selenophosphate.

15-20. (canceled).